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DEVELOPMENT AND VALIDATION OF ADOLESCENT RISK BEHAVIOR SCALE

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Abstract
Risk behavior performed by adolescence has a negative impact on the completion of developmental tasks. In addition, this behavior is directly or indirectly detrimental to the health and well-being of adolescents. This study aims to develop and validate adolescent risk behavior scale by examining its validity and reliability. This study used the confirmatory factor analysis (CFA) model using the AMOS 24 program. Participants involved were 881 high-school students. The indicators tested on this scale are alcoholic drinking behavior, Narcotics, Psychotropic and Other Addictive Substances Consumptionbehavior, and premarital sex behavior. The reliability test result was 0.988 with an item discrimination power of 0.776 - 0.950. While the construct validity test through the CFA test shows. p value = 0.000, GFI = 0.969 (≥ 0.90); AGFI = 0.942 (≥ 0.80), TLI = 0.986 (≥ 0.90), CFI = 0.990 (≥ 0.90) and RMSEA = 0.070 (0.05-0.010). Thus, it is concluded that the construct measurement model was in accordance with the empirical conditions based on the parameter values used for the model suitability test.

Keywords:
Adolescent Risk Behavior, Confirmatory Factor Analysis, Validation

Introduction

Risk behavior brings unwanted consequences and causes harm or loss, both to oneself and others (Salkind, 2008). This behavior is universal and can occur throughout the human lifespan. However, if it occurs during adolescence, risk behavior becomes a barrier to the comprehensiveness of adolescent development itself. Supposedly, when adolescents are living the most transitive life span, internal and external support should be obtained maximally in order to avoid obstacles in completing the development task itself. In fact, the majority of risk behaviors are initiated and intensively occurred in adolescence, Such as claim has been confirmed by empirical evidence(Klein-hessling et al., 2010; Richter, 2010; Ritcher et al., 2006). Therefore, the terminology of

adolescent risk behavior comes outspesifically.

There have been several measuring tools of adolescent risk behavior developed thus far such as The Adolescent Risk-Taking Quistionnaire (Gullone et al., 2000), the Canadian Risk-Taking Scale(Kwong et al., 2018)and Health Risk Behaviors Inventory (Irish, 2011). These measuring instruments are arduous to be used directly in Indonesian research settings. Apart from cultural and habitual differences, contextual differences regarding adolescent behavior also require some adjustments.

Aside from contextual differences, the majority of measurement tools developed in western countries refer to the risk behavior framework developed by the US Centers of Disease Control and Prevention (CDC) based on the results of the US Youth Risk Behavior Survey. This is a periodic survey of 13-18 years residents in the United States related to risk behavior (Kann, McManus, Harris, & Shanklin, 2018; Kwong et al., 2018).As result, the constructedtheory to measure the adolescent risk behavior on the existing instrument also includes several behaviors that are not a major behavior for adolescent risk behavior in Indonesia. For example, an unhealthy diet behavior is rarely found as anadolescent behavior in Indonesia. Therefore, it is considered necessary to develop an instrument of adolescent risk behavior in Indonesia using the Indonesian adolescents behavior propensity.

Legally and formally, the Ministry of Health and the Ministry of Social Affairs are in charge of any behavior with health-risk and psychosocial negative impact. Therefore, the instrument to be developed is based on the results of the Indonesian Demographic and Health Survey (IDHS) which is conducted regularly by the Ministry of Health of the Republic of Indonesia and complemented by survey results published by the National Narcotics Agency (BNN) (Badan Narkotika Nasional, 2016; BNN dan LIPI, 2018; Kementerian Kesehatan, 2017; Kementrian Kesehatan et al., 2017; Kusumawardani et al., 2015). To avoid unfamiliar measurements, the development of instrument also considers the demographic conditions of respondents, suhc as age, economic level, and education.These considerations have been made in order to define qualitative phenomena into quantitative phenomena that can be measured precisely and accurately(Andrich & Pedler, 2019).

This study aims to develop a risk behavior scale for adolescents that can measure risk behavior in the age range of 13-18 years. Confirmatory Factor Analysis (CFA) method was employed to validate the instrument and to obtain a scale with a high level of validation. It is expected that the instrument can be used in research related to adolescent risk behavior with a similar background conditions as Indonesia.

Literature review

Adolesecent Risk Behaviour

As mentioned in the previous section, the initiation of risk behavior mostly occurs in adolescents. Previous research also revealed

that the average age for first exposure to drinking was between 13-14 years old, while the peak preference for drinking was 15 years old, both for boys and girls (Richter, 2010). The latest report on youth risk behavior from surveillance-United States (2017) informs that up to the end of 2017, 29.8% of school-age adolescents had drunk alcohol, 19.8% had used marijuana, and 39.5% had had premarital sex (Kann, McManus, Harris, & Shanklin, 2018).

In Indonesia, the average age for the first time using drugs is 16 years, with the lowest age range being 10 years and the highest being 27 years (Badan Narkotika Nasional, 2016). Meanwhile,based on the Indonesian Demography and Health Survey, it is reported that the percentage of women who first consume alcohol under the age of 14 has increased from 10% (2007) to 17 percent (2017). Likewise, men also experienced an increase of consuming alcohol from 9% (2007) to 11% (2017))(Kementerian Kesehatan, 2017). Quantitatively, 41.2% of school-age adolescents have had sexual intercourse, 30.1% have had sexual intercourse for 3 months prior to the survey, and 11.5% have had sexual relations with four or more people (Badan Narkotika Nasional, 2016). These findings confirm that risk behavior is closely related to adolescents (Hale & Viner, 2016; Klein-hessling et al., 2010; Richter, 2010; Ritcher et al., 2006).

These facts can be explained in a psychosocial perspective which states that in the adolescence stage, there is a socialization process that demands very specific development tasks. In that period, adolescents are challenged with various tasks regarding with significant changes in their physical, thinking and emotional ways. In the other side, teenagers basically are children who will begin their independency. They already have the authority in making decisions independently. But on the other hand, teenagers are not emotionally fully mature. At the same time, he must adapt to the demands of his social environment (Ritcher, et al., 2006). In this process, there are many clashes between social roles and the development task of adolescents themselves.

Another reason to explain why risk behavior mostly occur during adolescent is the fact that during adolescence the teenagers are in a condition of being required to master their developmental tasks. Meanwhile, risk behavior comes from problems in mastery of the developmental task itself. This perspective is consistent with a contextual-development framework that emphasizes multidimensional and multi-directional development in the entire human life span (Hurrelmann& Richter, 2006). So that in this period, there is a meeting point between the magnitudes of the probability of starting risk behavior with a certain period in the life span, namely adolescence. Therefore, adolescent risk behavior becomes a more specific terminology in psychological studies.

Based on this discussion, adolescent risky behavior can be defined as any form of behavior carried out by adolescents that results in harm to themselves and or others in terms of health, welfare, social comfort

and the development of life for themselves and others.

Position of Risk Behavior among Adolescent Behaviors

Within the scope of school, the categorization of behavior is divided into 2 main categories, namely acceptable behavior and unacceptable behavior. Acceptable behavior is various behaviors that are widely accepted by the values and norms of community. In the other side, unacceptable behavior is various behaviors that can cause disturbance, distraction, loss and other behavior that cannot be widely accepted based on the values and norms of the community where he lives (Salkind, 2008). This category includes adolescent risk behavior.

The proportion between acceptable behavior and unacceptable behavior by students can be seen in the following model;

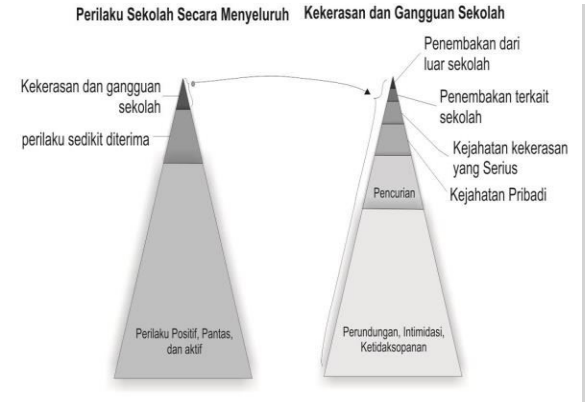

Figure 1. Acceptable and Unacceptable Behavior Positions
Source; (Salkind, 2008)

This model explains that the proportion of unacceptable behavior actually only occupies a very small part of the total student behavior (Salkind, 2008). Even so, unacceptable behavior must still be given special attention and treatment, so as not to interfere with the student's own pace of development. Richard, et al. (1998) stated that the involvement of adolescents in risk behavior is quite harmful to their development, such as physical health and growth, achievement of tasks and responsibilities in normal development setting, fulfillment of expected social roles, mastery of essential life skills, adequate competitiveness and competence, and also corresponding to the next period in the life span. (Richard, 1998). Therefore, even though the position of risk behavior is only the smallest part of student behavior, it is still considered very significant.

Dimensions of Risk Behaviour

Although the involvement of adolescents in risk behavior has been quantitatively reported, the broad scope of risk behavior requires firm boundaries to determineits categorization precisely. Irish (2011) categorizes risk behavior into seven main domains based on its high health risks, namely alcohol consumption, use of illegal drugs, risksexual behavior, smoking, low physical activity, consumption of unhealthy foods, and insufficient sleep. These seven behaviors can cause health problems such as radiovascular disease, stroke, liver and serious psychological disorders such as depression, anxiety, and suicidal thoughts(Cargiulo, 2007; Jané-Llopis & Matytsina, 2006; Mokdad, et al., 2004; Moore, 2010; Komasari & Mada, 2000; Fung, et al., 2001; Stampfer, 2000; Liu,

2003; Cappuccio, et al., 2010). Meanwhile, Mokdad, et al. (2004) has limited risk behavior into four categories known as "The Big Four Risk Behavior" namely lack of physical activity, unhealthy diet, smoking, and alcohol consumption. Similar to this category, Fine (2004) also categorizes these four behaviors as risk behavior with the difference in the unhealthy dietary behavior category which is replaced by excessive body weight(Fine, et al., 2004). Another meta-analysis study conducted byDryfoos (1990), risk behavior that is specifically related to adolescents includes four main categories, namely alcohol and other substance abuse, juvenile delinquency and antisocial behavior, adolescent sexual activity, and failed schooling. These four areas are the risky behaviors most exposed to adolescents.The differences in determining categories of adolescent risk behavior cannot be separated from the contextual differences of the adolescent lives suchcultural factors, customs, and even laws (Bronfenbrenner & Morris, 2006).

In recent decades, the risk behavior categorization has been referred towards the risk behavior framework developed by the US Center of Disease Control and Prevention (CDC). This framework is based on the results of the US Youth Risk Behavior Survey which is conducted periodically.There are six behaviors that are categorized as adolescent risk behaviors, namelydriving risk behavior, smoking, alcohol and drug use, risk sexual behavior (unwanted pregnancy, sexually transmitted diseases and HIV AIDS), unhealthy diet, and lack of physical activity. This categorization is considered valid since it is based on a large survey in the US. Meanwhile, in Indonesia, the reference for categorizing risk behavior is anchored by the Indonesian Demographic and Health Survey (IDHS) which is conducted regularly by the Ministry of Health of the Republic of Indonesia, The Central Bureau of Statistics The National Population and Family Planning Agencyand The National Narcotics Agency.

The findings from the US Youth Risk Behavior Survey by The US Centers of Disease Control and Prevention (CDC), the Indonesian Demographic and Health Survey (IDHS) and the National Narcotics Agency (BNN) have the same red line of categorization, namely the consumption of alcoholic beverages (Alcohol), Narcotics, Psychotypics and other Addictive Substances (Drugs) and sexual behavior at pre-marital age. This is supported by many other findings(e.g., Hale & Viner, 2016; Hidayangsih, 2014; Hidayangsih et al., 2011; Jessor et al., 2003; Kann, McManus, Harris, Shanklin, et al., 2018; Klein-hessling et al., 2010; Kusumawardani et al., 2015; Lestary & Sugiharti, 2011). Based on this argument, the dimensions that will be used as a construct of adolescent risk behavior are alcoholic drinking consumption behavior, narcotics, psychotropic substances and other dangerous substances consumption behavior and premarital sexual behavior.

Method

This study aims to develop an instrument to describe adolescent risk behavior as a product. The appropriate methodology used

to make, develop,and reconstruct a product is research and development (R&D).. According toGay et al. (2012), the research and development (R&D) approach is used in situations as follows: (1) the main objective is not to test the theory but to develop and validate aninstrument to ensure it works effectively and ready to use; (2) th products are developed to meet the needs of research and based on the specified specifications; (3) this method develops products that have been tested in the field and have been revised at a certain level of effectiveness; and (4) the development process takes place step by step causally.

The instrument was developed using Cronbach Alpha and Confirmatory Factor Analysis (CFA) methods with AMOS 24 program. The instrument was adapted from *the Canadian Risk-Taking Scale*(Kwong et al., 2018), *The Adolescent Risk-Taking Questionnaire*(Gullone et al., 2000), and *Health Risk Behaviours Inventory*(Irish, 2011). Meanwhile, the research procedure includes sample selection, explanation of measuring instruments to be developed, and data analysis.

Sample Selection

In selecting samples, we used purposive random sampling procedure. This procedure was used to obtain a sample that represents a variety of demographic backgrounds. The determination of the sample size is 5-20 times of the observed variable(Hair et al., 2019). In this study, there were 16 observed variables. Thus, the total sample size ranges from 96 - 340 students. However, by considering the diversity of respondents' backgrounds, 881 samples were selected. Respondents consisted of 402 men (45.62%) and 479 women (54.37%) with an age range between 15-18 years and the average age was between 16 to 17 years old. All respondents participated voluntarily and have understood the explanation provided regarding the research objectives and other necessary matters. Respondent names were made pseudonym.

Research Instruments

The instrument is in the form of a questionnaire containing three forms of adolescent risk behavior which are mostly practiced in Indonesia, namely 1) alcoholic drink consumption (both made by manufacture and made by mix themselves); 2) drugs and other addictive substances consumption; and 3) pre-marital sexual behavior. These components are a synthesis of the risk behavior framework developed by the US Centers of Disease Control and Prevention (CDC) based on the results of the US Youth Risk Behavior Survey, (Kann, McManus, Harris, & Shanklin, 2018; Kwong et al., 2018), Indonesian Demographic and Health Survey, a survey of Narcotics abuse and Health Risk Behavior among Junior and Senior High School Students in Indonesia (Badan Narkotika Nasional, 2016; BNN dan LIPI, 2018; Kementerian Kesehatan, 2017; Kementrian Kesehatan et al., 2017; Kusumawardani et al., 2015). These components are then studied, compiled, and modified by also considering and referring to the Adolescent Risk-Taking Quistionnaire*Quistionnaire*(Gullone et al., 2000), *the Canadian Risk-Taking*

Scale(Kwong et al., 2018) and *Health Risk Behaviours Inventory*(Irish, 2011).

Data analysis

Three stages were carried out in developing the instrument.First, we defined the constructs of instruments, searched for literature and articles as references, identified constructs to be used, and developed new measuring tools and conducting evaluations (Hairet al, 2014). The components of risk behavior based on the defined constructs are 1) consuming alcoholic drink (both made by manufacture and made by mix themselves) with several indicators such as first time of alcoholic drink consumption, frequency of alcoholic drink consumption, amount of alcoholic drink consumption, and tendency of consuming alcoholic drinking; 2) consuming narcotics, psychotropic and other addictive substances with indicators such as first time of substances consumption, frequency of substances consumption, amount of substances consumption, and tendency of consuming substances; and 3) pre-marital sexual behavior with indicators such as first time having sexual intercourse, number of sexual partners, frequencyof sexual activity, consideration of having save-sex, and tendency of having premarital sexual intercourse.

Second, we performed the validation procedure using expert judgment for content validity. This procedure was carried out to see to what extent the items have covered the relevancy of entire content. This procedure also ensured that the items involved measurement purposes. This procedure was not carried out through statistical analysis but rational analysis, by analyzing whether the test items have been written according to the previously determined blueprint. Therefore, the instrument was then consulted in depth to the expert to obtain an expert judgment. Furthermore, we analyzed the experts' assessment through calculating the validity coefficient using the Aiken's V formula.

Third, we tested the new instrument to examine its validity and analyzed it using the Confirmatory Factor Analysis (CFA) method using the AMOS ver 25 program. This procedure was known as construct validity. Construct validity is a validity test to examine how far the items could measure the several variables concept according to a specific concept that has been defined previously (Tuckman & Harper, 2012). The items or indicators of a construct must converge or share a high proportion of variance. This share proportion can be verified based on the value of loading factor. The loading factor value is fulfilled if it is at least 0.4 with an ideal value of 0.7 or more. On another side, item selection in the confirmatory factor analysis was carried out based on the goodness of fit criteria. Meanwhile, the criteria for goodness of fit were divided into into categories, namely 1) the Absolute Fit Category with Chi Square P-Valueparameters ≥0.05, Root Mean Square Error of Approximation (RMSEA) ≤0.08, Normed Fit Indexes (NFI), Incremental Fit Indexes (IFI) and Goodness of Fit Indexes (GFI) with each value ≥0.90, 2) Incremental Fit category with parameters Comparative Fit Index (CFI), Tucker-Lewis

index (TLI) and Adjusted Goodness of Fit Index (AGFI) worth ≥0.90, and 3) the Parsimonious Fit category with the Parsimonious Normal Fit Index (PNFI) parameter of 0.60 - 0.90. (Hair et al., 2019).However, it is challenging to fulfill the overall goodness of fit criteria. if one of the fit parameters in each category has been fulfilled, it is considered that it has fulfilled the goodness of fit criteria. Supporting this opinion, Hu and Bentler (1999) contended that the threshold value of goodness of fit is the fulfillment of at least three of the specified parameters, namely Chi-square/df (cmin/df) with a threshold value <3; good; <5 is sufficient, the p-value for the model with a threshold value> 0.05, CFI> with a threshold value of 0.95 is very good; > 0.9 good; > 0.8 is sufficient, GFI> with a threshold value of 0.95, AGFI> with a threshold value of 0.8, SRMR with a threshold value of <0.09, RMSEA with a threshold value of <0.05 is good; 0.05 - 0.10 is sufficient; > 0.1 is inadequate and PCLOSE with a threshold value of> 0.05 (Hu & Bentler, 1999).

Based on the Aiken 'V formula, the lowest tolerable limit in the Aiken V value for 14 experts is 0.78 with a significance level of p <0.05. For this reason, Aiken V values below 0.78 are aborted. Thus,only the items with Aiken V value in the range of 0.806-0.91 with a significance level of p <0.05 are taken. It is concluded that the items taken are in accordance with the definitive concept. The item changes before and after the validation test are as mentioned in table 1 as follows:

Table 1. Changes in items before and after the content validation test (AIKEN' V)

Aspect	Indicator	Before Content Validity Test	After Content Validity Test
Alcoholic drinking consumption	.First time of alcoholic drink consumption	3	1
	Frequency of alcoholic drink consumption	2	1
	Amount of alcoholic drink consumption	4	4
	Tendency to consume alcoholic drinking	3	0
Narcotics, Psychotropic and Other Addictive Substances Consumption	First time of substances consumption	2	2
	Frequency of substances consumption	4	3
	Amount of substances consumption	4	4
	Tendency to consume substances	3	1
Pre-Marital Sexual Behavior	First time having sexual intercourse	3	3
	Number of sexual partners so far	5	5
	Frequency of sexual activity	4	3
	Consideration of having save-sex	3	1
	Tendency to have premarital sexual intercourse	4	2
AMOUNT		44	30

After performing the content validity through expert judgment, the validation and development of the instrument went through the stage of reliability measurement. Reliability is defined as the degree of internal consistency of the measurement construct indicators (Hair et al., 2019). In this study, the reliability estimation has used the Cronbach Alpha. Azwar (2015) explains that reliability is considered satisfactory if the coefficient reaches a minimum of 0.90. Meanwhile, according to Wells and Wollack (2003)for a professionally developed high-stakes standardized test it must have an internal coefficient of at least 0.90, but on tests where the stakes are lower, the reliability value is at least 0.80 or 0.85. already deemed adequate.

In addition to internal consistency, another parameter of items selection is the discriminating power of items itself. The item discriminating power is the item capability to distinguish between individuals or groups of individuals who have and do

not have the measured attributes (Azwar, 2015). Moreover, the item discriminating power index is an indicator of the consistency between item functions and the overall scale function known as total item consistency. According to Azwar (2015), the item selection criteria are based on item correlation using the rix limit> 0.30. However, if the number of valid items is still insufficient to the desired number, the researcher may consider lowering the criterion limitation to rix> 0.25.

A series of calculations shows that the reliability coefficient of this adolescent risk behavior instrument is 0.988. Therefore, thisinstrument reliability is considered have satisfied the reliability requirements of a good instrument. Meanwhile, the value of the items' discriminating power on the four scales used in this study ranged from 0.776 - 0.90. This means that the item difference in this instrument is very good. The number of items that failed because they did not meet the criteria for rix> 0.3 was 14 items. Thus, the number of items to be tested through Confirmatory Factor Analysis is 16 items as shown in Table 2 as follows;

Table 2. The item changes before and after the Reliability Test (Alpha Cronbach Test)

Aspect	Indicator	Before Reliability Test	After Reliability Test
Consuming alcoholic drink	First time of alcoholic drink consumption	1	1
	Frequency of alcoholic drink consumption	1	1
	Amount of alcoholic drink consumption	4	1
	Tendency to consume alcoholic drinking	0	0
Consuming Narcotics, Psychotropic and Other Addictive Substances	First time of substances consumption	2	2
	Frequency of substances consumption	3	1
	Amount of substances consumption	4	2
	Tendency to consume substances	1	0
Premarital Sexual Behavior	First time having sexual intercourse	3	2
	Number of sexual partners so far	5	3
	Frequency of sexual activity	3	1
	Consideration of having save-sex	1	1
	Tendency to have premarital sexual intercourse	2	1
AMOUNT		30	16

Furthermore, those 16 items have been examined its loading factor using the Confirmatory analysis as follows:

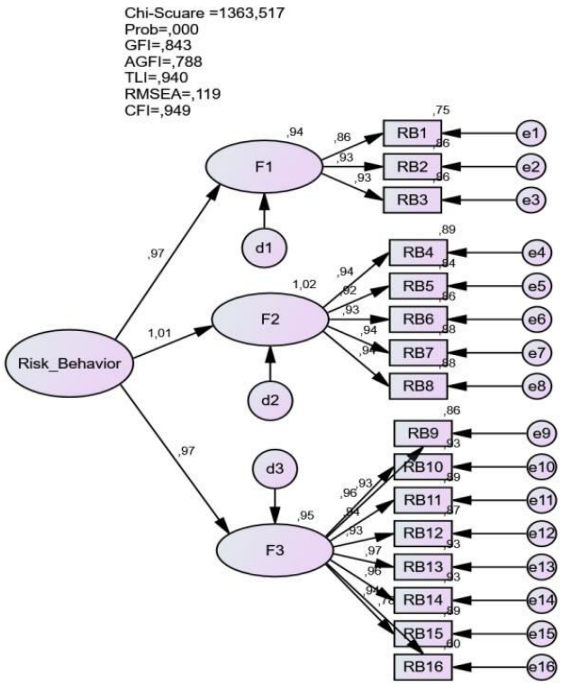

Figure 2. Confirmatory Factor Analysis (CFA) Adolescent Risk Behavior Scale for 16 items (before Modification)

The aspect of alcoholic drinking consumption is represented by RB1 and RB2, RB3, the aspect of Narcotics, Psychotropic and Other Addictive Substances consumption is represented by RB4, RB5, RB6, RB7, RB8 and the aspect of pre-marital sexual behavior are represented by RB9, RB10, RB11, RB12 , RB13, RB15, RB16.

The detailed item as explained in the table 3. The next step is examining the construct validity of these 16 items through confirmatory factor analysis. Thus, it can be selected which items has satisfy the goodness of fit criteria andvice versa. The results of construct validity measurements using confirmatory factor analysison adolescent risk behavior are described in table 4

Table 3. Risk Behavior Scale Items
(before Confirmatory Factor Analysis)

Aspect	Code	Items	Loading Factor	CR	AVE
Alcoholic drinking consumption	RB1	1. I consumed alcoholic drinking (including own mixing) when I was 15-16 years old	0.86	0.93	0.82
	RB2	2. I consume alcoholic drinking (including own mixing) more than 3 times per week	0.93		
	RB3	3. I spend up to 3 dozes of alcoholic drinking (including own mixing) every time I consume it	0.93		
Narcotics, Psychotropic and Other Addictive Substances	RB4	4. I consumed substances for the first time in the age range of 15-16 years	0.94	0.97	0.87
	RB5	5. I consumed substances for the first time in the age range of 13-15	0.92		
	RB6	6. I have consumed substances at least 2	0.93		

Consumption		times a week			
	RB7	7. I have consumed at least 2 dozes of substances a week	0.94		
	RB8	8. I take more than 1 doze of substances each time	0.94		
Premarital Sexual Behavior	RB9	9. I have had sexual intercourse	0.93	0.98	0.86
	RB10	10. I had sexual intercourse before I was 16 years old	0.96		
	RB11	11. I have had sexual relations with my boyfriend/girlfriend	0.94		
	RB12	12. I have had sexual relations with friends who are not my boyfriend/girlfriend	0.93		
	RB13	13. I can have sexual relations with new person as long as I feel fine	0.97		
	RB14	14. I have had sexual relations with more than 1 person	0.96		
	RB15	15. I have sexual intercourse at least once every two weeks	0.94		
	PB16	16. If my parents seems fine with my girlfriend/boyfriend, it is fine also to have sexual intimation	0.78		

Table 4. Results of the Confirmatory Factor Analysis of the Risk Behavior Scale

Goodness of Fit	**Criteria**	**Statistical Value**	**Outcome**	**Reference**
GFI	≥ 0.90	0.969	Passed	Hair, et al, 2019
AGFI	≥ 0.90	0.942	Passed	Hair, et al, 2019
TLI	≥ 0.90	0.986	Passed	Hair, et al, 2019
CFI	≥ 0.90	0.990	Passed	Hair, et al, 2019
RMSEA	<0.05 is good; 0.05 - 0.10 is sufficient; > 0.1 is not sufficient	0.070	Passed	Hu &Bentler, 1999

This construct measurement model is in accordance with empirical conditions based on the parameter values used to test the suitability of the model, namely Probability, GFI, AGFI, CFI and RMSEA, so the measurement model considered as fit. The value of this instrument is P value = 0.000, GFI = 0.969 (≥ 0.90); AGFI = 0.942 (≥ 0.80), TLI = 0.986 (≥ 0.90), CFI = 0.990 (≥ 0.90); and RMSEA = 0.070 (<0.05 good;

0.05 - 0.10 sufficient;> 0.1 insufficient). The next step is selecting items that have a loading factor value above 0.4 and do not have cross loading with other items. This process left 11 items out of 16 tested. This is as shown in Figure 1 below:

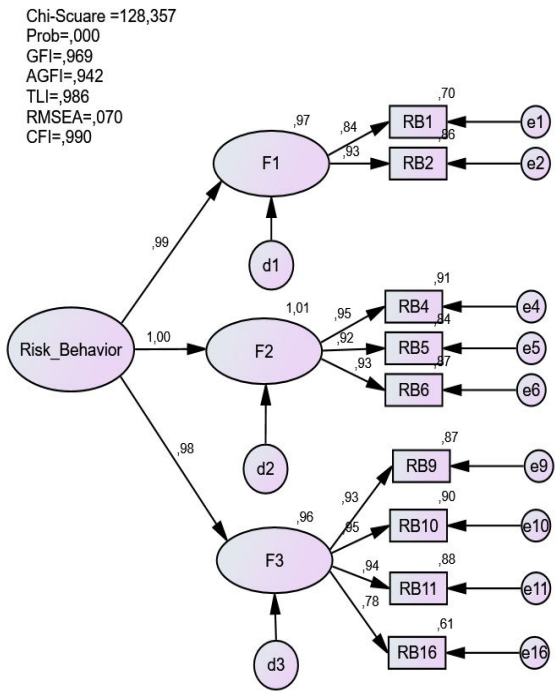

Figure 2. Results of the Confirmatory Factor Analysis (CFA) of the Adolescent Risk Behavior Scale

The is represented by RB1 and RB2, the aspect of Narcotics, Psychotropic and Other Addictive Substances consumption is represented by RB4, RB5, RB6 and the aspects of pre-marital sex behavior is represented by RB9, RB10, RB11, RB16. The items selected as shown in table 5.

Table 5. Risk Behavior Scale Items After ConfirmatoryFactor Analysis

Aspect	Code	Items	Loading Factor	CR	AVE
Alcoholic drinking consumption	RB1	1. I consumed alcoholic drinking (including own mixing) when I was 15-16 years old	0.84	0.88	0.79
	RB2	2. I consume alcoholic drinking (including own mixing) more than 3 times per week	0.93		
Narcotics, Psychotropic and Other Addictive Substances consumption	RB4	4. I consumed substances for the first time in the age range of 15-16 years	0.95	0.95	0.87
	RB5	5. I consumed substances for the first time in the age range of 13-15	0.92		
	RB6	6. I have consumed substances at least 2 times a week	0.93		
Premarital	RB9	9. I have had sexual intercourse	0.93	0.95	0.81

Sexual Behavior	RB10	10. I had sexual intercourse before I was 16 years old	0.95		
	RB11	11. I have had sexual relations with my boyfriend/girlfriend	0.94		
	RB16	16. If my parents seems fine with my girlfriend/boyfriend, it is fine also to have sexual intimation	0.78		

Discussion

The confirmatory factor analysis indicates that the three components of adolescent risk behavior can measure the intended behavior appropriately through the goodness fit of model. Our finding echoes previous research byKwong et al. (2018)which categorizes various adolescent risk behaviors into three main groups, namely Overt Risk Taking which includes the use of addictive substances and external risk behavior, aversion to a Healthy Lifestyle which includes lack of healthy food consumption and lack of physical activity, and Screen Time Syndrome which includes the habit of consuming unhealthy snacks while watching TV and similar activities. This study revealed that the highest Overt Risk Taking is the consumption of alcohol, addictive substances, and risk sexual behavior.

By considering the loading factor value on the aspect of the alcoholic drinking consumption behavior, it is observed that the item asking for the frequency of drinking alcoholic drinking has the highest value. Similarly, Kwong et al. (2018) also revealed that the frequency of drinking alcohol has a high factor loading value in measuring the tendency of adolescent risk behavior. Likewise, items that state the initiation of drinking alcoholic behavior carried out in mid-adolescence (aged 14-15 years) have a high loading factor, which is 84%. In the same vein, Rodrigues et al. (2018)found that the first contact with alcoholic drinking is at the age of 14. In another study,Hale and Viner (2016)confirmed that the initiation of risk behavior initially has begun in mid-adolescence,and it has shifted to the early adolescence and some mid-adolescence (age range of 13-16 years). Likewise, data released by the Ministry of Health of the Republic of Indonesia in collaboration with the Population and Family Planning Agency and the Central Statistics Agency documented that 70% of men and 58% of women started drinking alcohol at the age of 15 (Kementrian Kesehatan et al., 2017). Meanwhile, a survey conducted by the Health Research and Development Agency of the Republic of Indonesia stated that there are 9.8% of junior high and high school students who have consumed alcoholic drinking and the majority started at the age of 14 or 15 years (2.20%), followed by the 12 or 13 year age group (1.78%). The rest were spread in the age group 7 years or less (1.40%), 8 or 9 years (1.19%), 10 or 11 years (1.24%), 16 or 17 years (0.93%) and

18 years or more (0.01%). (Kusumawardani et al., 2015).

The factor confirmatory analysis result for of Narcotics, Psychotropics and other Addictive Substances aspect showed that the initiation of drug consumption was in Middle Adolescence (age range between 15-16 years). Sucha case occurred since the previous question related to the initiation of alcoholic drinking consumption, both manufacturer alcoholic product and own mixtures are also in the same age range. This finding is supported by previous studies, including the Indonesian Demographic and Health Survey of adolescents (Kementrian Kesehatan et al., 2017), the Health Risk Behavior Survey for Junior and Senior High School Students in Indonesia(Kusumawardani et al., 2015; Kusumawardani & Suhardi, 2011),and a longitudinal study conducted in the UK (Hale & Viner, 2016).

Aside from the study done byKwong et al. (2018)that put premarital sexual behavior as the top threeadolescent overt taking behavior, premarital sexual behavior is also one of the main concerns in Ghana and other African countries(Agambire et al., 2019). Likewise, premarital sexual behavior in adolescents is increasingly worrying and also occupies the top three risk behaviors of adolescents in Portugese context (Rodrigues et al., 2018). In the Indonesian context, premarital sexual behavior is also a special concern of government, as disclosed in the Indonesian Demographic and Health Survey of Adolescent Reproductive Health report, which warned the dangers of premarital sexual behavior against unwanted pregnancies (Kementerian Kesehatan, 2017). Based on the loading factor value, items that examine the experience of premarital sexual behavior have a loading factor value that is almost as high as the initiation of premarital sexual intercourse. As predicted before, this result is slightly identical with the results of the Indonesian Demographic and Health Survey of adolescents in 2017 which has revealedthat the initiation of premarital sexual relations occurred at the age of 15-19 years with the highest percentage at the age of 17 years (19%). It is also nearly the same as the average age of initiation of premarital sexual behavior in West Ethiopia, namely 16.9 + -1.2 years (Munea et al., 2020). However, sucha claim is different from the findings in other countries where premarital sexual intercourse was initiated at a younger age,among others are the ages of 15.72 years in Sweden (Strandberg et al., 2019)and 12.9 years in Portugal, (Rodrigues et al., 2018).

Anchored by the above-mentioned findings, one critical question remains unanswered: why do so many risk behaviors begin at adolescence and almost similar across countries and cultures?. Several experts revealed that adolescence is an important period with many critical transition includes the puberty biological changes, the independence need as an adult, preoccupation with theirself, and several normative experimentation (Berenbaum et al., 2015; Farley & Kim-spoon, 2014). Consequently, during the phase of transition from childhood to adulthood, adolescents struggle to make some choices and initiate some new patterns of behavior that affect both their current and future health (El Achhab et al., 2016). Another theory

emphasizes on behavioral change as social cognitive theory based and social-ecological model of health. This model emphasizes a dynamic interaction among cognitive, behavioral, and environmental factors that involve individuals, families, and communities contributing to the behavior..(Glanz et al., 2008). As a result, the interaction among those factors contribute to the behavior itself. Eventually, it also impacts to the health of populations. This theoretical underpinning is supported by empirical evidence (e.g., Rosario et al., 2014) that emphasizes on the significance of comprehensive treatment to overcome the adolescents risk behavior. Therefore, it is essential to understand factors at multiple levels, including the adolescent, family, school, and community.

Conclusion

This paper portrays the development and validation of a risk behavior scale for adolescents. Based on the findings, the developed scale refers to the three main constructs of risk behavior by Indonesian adolescents both in Indonesian and other countries. The results of the validity test through Confirmatory Factor Analysis (CFA) show that this scale has good validity and reliability. The final results of the measurements that have been carried out produce nine items measuring the scale of adolescent risk behavior. Those nine items has shown its ability to reflect the risk behavior performed by adolescents. Therefore, this instrument satisfactory to be used in the similar research

Limitations and Future Studies

One of the limitations of this study is that the sampling was less extensive in terms of age ranges. Therefore, further research is expected to employ wider samplesfor ages so that it can be generalized to all adolescent age range. In addition, further research should be carried out in different countries with different cultures in order to expand the scale validation with a wider scope.The developed and validated adolescent risk behavior scale has provided a new perspective on risk behavior which is specifically used to measure risk behavior among adolescents in Indonesia. For this reason, we expect that further research is carried out outside the adolescent age range and applied outside Indonesia.

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